



**U. S. GOVERNMENT
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**ASSESSMENT
REPORT
08-12**

**ASSESSMENT OF GPO'S TRANSITION
PLANNING FOR INTERNET PROTOCOL
VERSION 6**

September 30, 2008

OFFICE OF INSPECTOR GENERAL



U.S. GOVERNMENT
PRINTING OFFICE
KEEPING AMERICA INFORMED
WASHINGTON, DC 20401

Memorandum

OFFICE OF THE INSPECTOR GENERAL

DATE: September 30, 2008

REPLY TO

ATTN OF: Assistant Inspector General for Audits and Inspections

SUBJECT: Final Report on Assessment of GPO's Transition Planning for
Internet Protocol Version 6
Report Number 08-12

TO: Chief Information Officer

The Office of the Inspector General (OIG) has completed an assessment of GPO's planning for the transition from Internet Protocol version 4 (IPv4) to version 6 (IPv6).¹ The Office of Management and Budget (OMB) recently announced that all Executive branch agencies reported meeting a June 30, 2008 deadline for successfully demonstrating IPv6 capability for their network backbones. While GPO was not required to meet the OMB deadline, IPv6 capability will provide certain benefits to GPO as industry provides products and services that are IPv6-enabled.

This report contains two recommendations made by the OIG to enhance planning for the IPv6 transition at GPO, and management's response to those recommendations. Our evaluation of management's response has been incorporated into the body of the report and is included in its entirety in Appendix A. We consider management's proposed actions responsive to each of the recommendations. Recommendation 1 will remain open for reporting purposes until the proposed corrective action is completed. We are closing recommendation 2 upon issuance of this final report.

Background

IPv6 is a developing protocol and industry is currently designing products and services to use features of IPv6 beyond increased address space. Anticipated benefits of IPv6 include:

¹ Internet routing protocols are used to exchange information across the Internet. The services are transparent to the user of the computer and are built using a layered approach. Protocols are standards that define how computer data is formatted and received by other computers.

- Labeling IPv6 information channels for special handling, such as higher qualities of service², and
- Better authentication, data integrity, and data confidentiality.³

OMB Memorandum Number 5-22 required all Executive Branch agencies to prepare individual agency routing services to be compatible with IPv6 routing⁴ by June 30, 2008. The memorandum does not require that agencies discontinue or block IPv4 routing; rather it is intended to have agencies build out IPv6 services from their core network routing infrastructures.

The National Institute of Standards and Technology (NIST) produced detailed technical guidance informing agency transition planners of options available to get IPv6 services minimally functional at their agency. Additionally, the CIO Council authored a set of minimum requirements known as the “Demonstration Plan” to provide agencies with compliance testing criteria specifically at core edge routing devices.⁵ Finally, NIST will issue a standards document in the near future that will detail the federal requirements for secure and interoperable network products in the global IPv6 marketplace.

While GPO is not required to comply with OMB requirements, IPv6 compliance is important because IPv4 address allocations are a finite resource. The American Registry for Internet Numbers⁶ reports that approximately 19 percent of the IPv4 address space remains. While it does not appear that GPO will exhaust its address space anytime soon, the Internet at large will and therefore a shift to IPv6 services is highly likely.⁷ Because information exchange is critical to GPO’s transition to a modern digital agency, GPO should be capable of communicating with other federal agencies and public sources that successfully transition to IPv6. Therefore, GPO should be planning for the establishment of secure, shared IPv6-enabled network services during regular technology upgrade cycles. As new GPO business processes are established, IPv6 capabilities to foster security and robustness should be considered.

² Quality of service features allow for routing of services that cannot withstand any disruption in the flow of information. For example, voice and video conversations cannot withstand long and choppy pauses and therefore require constant information flow through the network.

³ Authentication in computing is verifying the identity of a subject requesting the use of a system and/or access to a network resource. Data integrity ensures the data is valid and accurate as intended. Confidentiality serves to keep information secret and readable to intended recipients.

⁴ Internet routing is one of the five layers of the Internet protocols. It allows computers to be identified uniquely across a great distances of physical separation and distinct computing hardware and software.

⁵ The router that connects the agency directly to Internet routers.

⁶ The American Registry for Internet Numbers is one of five Regional Internet Registries. The Regional Internet Registries control the allocation of IP addressing for the world.

⁷ As of January, 2008 GPO owned enough IP addresses to allocate up to 16,384 independent routing devices and 65,534 independent client and server addresses.

Findings

GPO plans to transition to IPv6 as part of a broad acquisition plan to update its IT infrastructure. Specific target dates for these updates have not been finalized. The OIG believes that the planned transition is a good long-term approach. In the short-term, GPO should consider implementing OMB's minimum IPv6 requirement, the NIST defined dual stack,⁸ at its core edge routers. Implementing this minimum requirement will ensure that technical resources such as GPO's new Federal Digital System (FDsys) are capable of ingesting information from IPv6 sources.

GPO does not have a large set of edge core routers. Two active routers support GPO Headquarters operations, and one router supports the new Secure Production Facility in Mississippi. GPO's Information Technology and Systems network personnel are capable of programming the IPv6 dual stack into the core edge routers. A dual stack implementation will allow GPO to add IPv6 routing and services slowly across its internal network.

Recommendations

The GPO Chief Information Officer should:

Recommendation 1. Require implementation of the NIST defined dual stack methodology at GPO's core edge routing devices.

Management's Response. Concur. The GPO network modernization project will ensure that this requirement is fully implemented at all edge routing devices in the GPO network.

Evaluation of Management's Response. Management's planned action is responsive to the recommendation. The recommendation is resolved but undispositioned, and will remain open for reporting purposes until the proposed action is completed. The complete text of management's response is in Appendix A.

Recommendation 2. Establish an IPv6 assessment team to monitor the availability of IPv6 products and services and make recommendations on how GPO can best leverage the benefits of IPv6.

Management's Response. Concur. This will be done as part of the GPO network modernization project, which is funded and is now underway (see Appendix A).

Evaluation of Management's Response. Management's planned action is responsive to the recommendation. We are closing the recommendation upon issuance of this report.

⁸ An Internet Node capable of communicating using either or both of IPv4 and IPv6.

We appreciate GPO management's cooperation during the assessment. If you have any further questions concerning this report, please contact Mr. Brent Melson, Deputy Assistant Inspector General for Audits and Inspections, at (202) 512-2037, or me at (202) 512-2009.

(Original signed by)

Kevin J. Carson
Assistant Inspector General for Audits and Inspections

cc:
Chief of Staff
Chief Management Officer
Chief Technology Officer

Appendix A. Management's Response

U.S. GOVERNMENT PRINTING OFFICE

Memorandum

DATE: September 11, 2008

REPLY TO
ATTEN OF: Chief Information Officer (CIO)

SUBJECT: Assessment of GPO's Transition Planning for Internet Protocol
Version 6

TO: Assistant Inspector General for Audits and Inspections

REFERENCE: Electronic Mail from Assistant Inspector General for Audits and
Inspections, dated July 14, 2008 , Same Subject

My office has reviewed the subject Assessment and the
recommendations made, and we have the following response to share:

Recommendation 1: The Chief Information Officer should require
implementation of the NIST defined dual stack methodology at GPO's
core edge routing devices.


IT&S Response: Agree. This has been done for all recent router
installations for the GPO network's edge routing devices, and the
GPO network modernization project will ensure that this requirement
is fully implemented at all edge routing devices in the GPO
network.

Recommendation 2: The Chief Information Officer should establish
an IPv6 assessment team to monitor the availability of IPv6
products and services and make recommendations on how GPO can best
leverage the benefits of IPv6.

IT&S Response: Agree. This will be performed as part of the
requirements analysis and design phases for the GPO network
modernization project, which is funded and is underway now.

If you have any questions on the response above, please contact me.

Thank you for your cooperation in this matter.


Michael Wash
CIO

Appendix B. Status of Recommendations

Recommendation No.	Resolved	Unresolved	Open/ECD*	Closed
1	X		TBD	
2	X			X

*Estimated Completion Date